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Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Pollution and Energy****Seventy-fourth session**

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Item 8 of the provisional agenda

Draft Regulation on uniform provisions concerning the approval of Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS) to be installed on heavy duty diesel engines and vehicles**Proposal for a Supplement to the draft Regulation on uniform provisions concerning the approval of Heavy Duty Dual-Fuel Engine Retrofit Systems (HDDF-ERS) to be installed on heavy duty diesel engines and vehicles****Submitted by the expert from the Netherlands***

The text reproduced below was prepared by the expert from the Netherlands to address concerns raised at the June 2016 GRPE session on the back-to-back approach for the simplified test of retrofitted dual-fuel engines. The draft Regulation was submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration and vote at their November 2016 sessions (ECE/TRANS/WP.29/2016/110). The modifications to ECE/TRANS/WP.29/2016/110 are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposals

Annex 6, paragraph 10.1., amend to read:

"10.1. Tests and requirements

An engine representative of the desired extension of the application range shall be tested in accordance with the provisions set out in paragraph 5.2.2. or 10.1.1. at the choice of the dual-fuel engine retrofit system manufacturer. Engine tests in accordance with paragraph 5.2.2. are always required for the extension of an application range with an engine family equipped with EGR.

The tests in accordance with paragraph 10.1.1. shall be carried out on a representative engine equipped with a member of the dual-fuel engine retrofit system family.

The same tests shall be performed in diesel mode and in dual-fuel mode in such a way that the operating points and conditions are as similar as possible.

The NO_x, Non-Methane Hydrocarbons (NMHC), CO and PM emission test results in dual-fuel mode shall be lower than or equal to the results in diesel mode.

Alternatively, at the request of the engine retrofit system manufacturer, the CO₂ specific emission results of the test in accordance with paragraph 10.1.1.1. in dual-fuel mode shall not exceed the applicable original emission limits for diesel operation as specified in Regulation No. 49 and transposed into CO₂ specific emission limits with the following equation:

CO₂ specific emission limit = 1.6 × 1.5 × brake specific emission limit

Where:

CO₂ specific emission limit is expressed in [g/kgCO₂]

1.6 is the conversion factor from brake specific to CO₂ specific emissions

1.5 is the Conformity Factor

brake specific emission limit is expressed in [g/kWh]"

II. Justification

A. Introduction

1. During the seventy-third session of the Working Party on Pollution and Energy (GRPE), the expert from the European Liquefied Petroleum Gas Association (AEGPL) raised concerns regarding the back-to-back approach for the simplified test of retrofitted dual-fuel engines because in some cases the hydrocarbons (HC) and/or carbon monoxide (CO) emission values of the original diesel engine are far below the emission limit (ECE/TRANS/WP.29/GRPE/73, para. 28).

2. Although this back-to-back testing method is successfully applied in the United States of America for compliance testing of retrofitted dual-fuel vehicles, this is a legitimate concern.

3. However the Netherlands have several observations regarding the solution proposed by AEGPL and submitted in GRPE-73-07 at the June 2016 GRPE session:

(a) The emission performance of the selected diesel engine is not known (above or below the emission limit and how far from the limit);

(b) Non-methane hydrocarbons (NMHC) emission cannot be disregarded because NMHC is an important air quality regulated pollutant emission;

(c) The diesel emissions of CO and HC could be far below the emission limit and hence a factor of two would not be sufficient. Increasing this factor is problematic because of subparagraphs (a) and (b).

B. Alternative solution

4. A better approach would be to measure the brake specific emissions and to compare those with the emission limits.

5. However, to compare the Portable Emissions Measurement System (PEMS) measured emissions of a retrofitted dual-fuel engine with the brake specific emission limits was seen as impossible and/or impracticable, as discussed in previous meetings, but a solution has been found by using a CO₂ specific emissions approach. This solution was discussed and well received during a web-meeting with experts from Contracting Parties and stakeholders.

6. This proposal implements this solution by amending ECE/TRANS/WP.29/2016/110.
